

afterwards, stayed there nine months; felt well afterwards, until October, 1904; then cough, night sweats and frequently sputum tinged with blood. February, 1905, very bad hemoptosis; June, 1905, bloody sputum for four days; since then bloody sputum every day more or less; three months ago pains in swallowing and hoarseness. Examination January, 1906: Dullness of right apex, sharp breathing during inspiration and prolonged sharp breathing with bronchial tendency during expiration; moist and dry rales. Trial injection of one-third milligram of tuberculin; highest temperature, 103.2 degrees eight hours after injection; disappearance of reaction after twenty-eight hours. Beginning of treatment with one-fifth milligram of tuberculin. After two months, gain in weight of fourteen pounds; night sweats have disappeared; very little cough and sputum; only some sharp breathing at end of expiratory act. Ulcerations in throat, according to report of Dr. Pischel, have disappeared.

Report of Dr. Pischel: Mrs. O. K.; February, 1906. Vocal cords injected, rough, and on posterior wall a flat ulcer. Cannot speak above a whisper; swallowing is painful. After application of menthol-anesthesin emulsion, the patient is able to eat for a few hours. Every few days the larynx is being touched with lactic acid.

March 2. Throat feels perfectly well. March 16. I find in my case-book: vocal cords still injected, but nearly smooth; posterior wall smooth; voice slightly husky.

### COMPULSORY REGISTRATION AND FUMIGATION, THE MOST IMPORTANT OF ALL PROPHYLACTIC MEASURES IN THE PREVENTION OF PULMONARY TUBERCULOSIS.\*

By GEORGE H. KRESS, M. D., Los Angeles.

A disease which so far back as medical records go has always held the post of dishonor at the head of the mortality tables of the human race; a physical affliction so widespread that one investigator, Nægeli, claims that at some time during life 97 per cent. of all persons are infected therefrom; a scourge that at the present time is responsible for one out of every ten deaths from all causes; a plague which in the United States annually carries to premature graves a total of more than 150,000 persons, which lives expressed from the standpoint of dollars and cents means a financial loss to our country of more than 300 million dollars yearly; a disease which in our own State of California is responsible for a loss of eight million dollars annually, in that it destroys four thousand lives every twelve months, a loss of life which gives to the Golden State the highest tuberculosis mortality percentage in the Union, whereas its climatic, industrial and sociologic conditions should give it almost the lowest;—such a disease as this, threadbare though a discussion of its various phases may be, needs no apology for having centered upon it the continued consideration of an organization such as the Medical Society of the State of California, an organization that has its being, and which holds its annual meetings for the purpose of aiding its members, individually and collectively, to gain knowledge and strength in their fight against man's mortal enemies. And of these

enemies to the life of man, none takes precedence over the great white plague.

The thought which this paper would bring forward and emphasize is that the most important of all measures in the prevention of tuberculosis, so far as regards effective results, thoroughness and feasibility, are compulsory registration and fumigation; further, that compulsory registration and fumigation are the foundations upon which any elaborate superstructure of prophylaxis which might be brought forward, must of necessity stand; and lastly, that the institution of these important and much needed measures must and should come about through the Medical Society of the State of California and its subordinate organizations, the various county medical associations of the commonwealth.

Speaking generally, the prevention of a disease is a warfare against its causes; and the causes of tuberculosis, like other germ diseases, are of two classes: One, the accessory or predisposing causes or all those etiological factors that make a human being a more favorable host or victim of the second or exciting or specific cause, the germ itself; the micro-organism at fault in the "great white plague" being the bacillus tuberculosis of Robert Koch.

That a diminution in the amount of tuberculosis morbidity and mortality would result from the elimination of the accessory or predisposing factors or those causes which debilitate the individual, no one will deny. The vital statistics of large centers of population, where housing and working conditions and modes of living have been much improved during the last quarter of a century, fully attest this fact. But it would be foolish to imagine that the human race will ever reach that much desired millennium, certainly that it is to reach it within the next ten, twenty or thirty years, when because of ideal environments and modes of life, all men will be endowed with a physiological resistance more than sufficient to enable their bodies to bid defiance to pathogenic micro-organisms.

Distasteful though the acknowledgement may be, it is quite safe to say that the overworked and underfed human beings who voluntarily or of necessity live in overcrowded and underventilated workshops and homes—from which class the vast majority of the victims of the "great white plague" may be said to come—are not apt to experience in the next few years an excessive amelioration in the hardness of their lot; for selfishness, ignorance and criminal carelessness remain, and give every promise of remaining for some time, as mighty forces in this world of man. It is true that progress in the way of more hygienic workshops and homes, and in the hours of labor, is constantly being made, but this progress is not, at the present time, and for some decades to come will not be sufficiently great to be anything but what might be called a minor factor in a scheme that would entirely prevent tuberculosis.

The fight against tuberculosis must, then, in the first instance, be a fight against the exciting or specific cause of the disease, the bacillus tuberculosis, and it is necessary, therefore, to consider the sources

\*To have been read at the Thirty-sixth annual meeting of the State Society, San Francisco, April, 1906.

and the manner in which this germ enters the human host and induces infection.

The consensus of opinion among medical men today is that the infection of human beings with tuberculosis can come from either human or bovine sources, the researches of Koch and Shutz, however, indicating that only in exceptional instances is the infection to be traced to cattle. Since the destruction of herds having the perlsucht would be exceedingly costly, the efforts so directed would hardly be repaid, so far as a decided diminution in tuberculosis morbidity and mortality are concerned, and a decided reduction in tuberculosis morbidity and mortality is that for which the world is striving.

Robert Koch put this thought in excellent form when at the British Tuberculosis Congress in 1902, at which time he promulgated his views that only in rare instances was bovine tuberculosis transferable to man, he committed himself as follows in the concluding paragraph of his paper: "In this connection, I can only repeat what I said in my London address of 1901: The fight with tuberculosis must not be fought on wrong lines, if it is to have a real result. It must aim at shutting off the chief, indeed we may say almost the only source of infection. This is those consumptives, who in consequence of the unfavorable conditions under which they live or because they obstinately set aside the simplest rules for the prevention of infection, are a danger to their companions."

In these few words by Robert Koch, we may say we have the keynote of our struggle against the great white plague. To carry Koch's thought further, we ask ourselves in what special manner are these consumptives of whom he speaks, dangerous to their fellows, and how, without being inhumane to them, can we eliminate them as factors dangerous to the public health, particularly of the public health of our own State of California?

Consumptives are a menace to the health of their fellows, because the sputum of a single such individual may contain in twenty-four hours not only millions but several billions of the bacilli of tuberculosis. These bacilli, according to the physical environment into which they are thrown, retain their virulence from a few hours to months; sputa containing the germs, losing its virulence in a few hours, if exposed to sunlight and air, but retaining its virulence for days or even months, if expectorated in dark, damp rooms, where there is little sunlight or poor ventilation. Since the dried sputum in the form of dust may have myriads of bacilli clinging to it, it is easy to understand how persons who occupy rooms or beds recently vacated by consumptives, must of necessity inhale the germs, and if these persons be below par physically or the germs of unusual virulence, how such an experience may lead to infection.

The sputum, then, in the great majority of instances, is the medium through which infection is carried from one person to another, and the task of preventing the disease, therefore, practically narrows itself into a proposition of rendering the sputum, and especially the sputum found in unsanitary rooms where consumptives have lived, innocuous.

Keeping in mind this most frequent of all modes of infection, it is easy to understand why tuberculosis may justly be styled both a house and a filth disease.

Two ways suggest themselves whereby sputum can be eliminated as a source of infection: One, by segregating consumptives and so preventing their sputum from ever reaching their, as yet, non-infected fellows; and two, by non-segregating consumptives, but by adopting such means as will destroy the bacilli in their dangerous excretions.

A moment's thought will demonstrate the impossibility and impracticability of the segregation method as a means of preventing tuberculosis on a large scale. In California, 4,000 persons die from pulmonary tuberculosis every year, and to make prophylaxis effective, these persons and at least twice as many more who are in the open stage of the disease in which bacilli are being constantly expectorated, would have to be segregated; that is, be placed in special hospitals, sanatoriums or camps. The four thousand in the last stages of the disease would need to be in such institution for at least one year. The remaining 8,000 might average six months. This makes no allowance for the influx of other consumptives from the East who would come here, if such institutions were established, in the hope of obtaining free treatment in a favorable climate. In other words, 8,000 beds would be needed to care for California's tuberculous patients by the segregation system of prevention, and the equipment of the institutions of this capacity, even along the most economical tent cottage lines would cost about \$300 a bed, or about \$2,400,000, while the cost of food and nursing could hardly be brought below ten dollars per week for each patient, or \$80,000 every week; that is, an annual outlay of \$4,160,000, making a grand total of expenses for the first year of \$6,560,000, a figure so generously excessive, when contrasted with the actual resources of our State treasury, or the willingness of our State legislators to expend it for such purpose, as to be virtually preposterous.

Such a universal segregation system, granted the state could afford to institute it, would be strongly objected to by consumptives, their relatives and friends, since it would mean a dissolution of family ties. Moreover, universal segregation could only be carried out by force and forcible segregation could not gain the sanction of the law, since it would not be very difficult to prove it an infringement of individual liberty. But even by this segregation system, it would be necessary to adopt compulsory registration and fumigation; the registration so that the consumptives could be segregated, and fumigation, so that the sputum could be destroyed. The reason, in fact, why there are fewer cases of infection on record in sanatoria than without, is almost entirely accounted for because the sputum is so carefully destroyed.

There remains to be considered, then, the only one other comprehensive method of preventing tuberculosis, and that is, the non-segregation plan where, however, the sputum is robbed of its danger; in other words, the non-segregation plan which has as its basic principles compulsory registration and

fumigation. (As parts of the system of compulsory registration and fumigation are included free sputum examinations by city, county or state health departments, not only to facilitate earlier diagnosis, but to repay the physicians in part for the trouble they are put to in filling out the circulars of the department and for fulfilling other requirements of the law. Anti-spitting ordinances to apply to public sidewalks, vehicles and elevators are also included, since these measures have a general educational effect at least.)

Voluntary registration and fumigation need only to be mentioned to be dismissed, since reason and practice alike have proven them to be insufficient. Take Los Angeles, for instance. In 1904, there were 645 deaths from pulmonary tuberculosis and probably four or five times that number of tuberculous sick in the city, and yet there were only 206 living cases of the disease reported, a percentage of only 31 per cent. of those actually dying or about 10 per cent. of those actually in the city, and this, too, in spite of the fact that the health office made free sputum examinations. Moreover, in voluntary notification, one layman cannot understand why tuberculosis in his family should be reported by his physician, when a consumptive neighbor is not reported by a brother physician. Experience, then, has thoroughly demonstrated the impracticability of voluntary registration.

The best way, and in fact the only way, by which to educate the profession and laity as to the prophylactic value of registration and fumigation measures is by making their use compulsory. In other words, since passing the matter up to the voluntary action on the part of physicians and laity only demonstrates its non-success, we are forced to resort to demonstration first and reason and explanation afterwards.

The need for compulsory registration and fumigation is so great, the reasons for their adoption so rational, their mode of application through health departments and officials already in existence is so feasible and could be made so economical and thorough, and the demonstration by the cities that have used them is so convincing, that a discussion of their value and practicability is really not pertinent to the question before us. It is in no sense a proposition to try a theoretical method, but one the practicability of which must at once appeal to all of us.

Herman H. Biggs, Medical Officer of the Department of Health of New York City, to whom the world is indebted for the institution on a large scale of the value of compulsory registration and fumigation, made his first recommendation in regard thereto as early as 1887. In 1893, he was able to institute voluntary notification, and in 1897 compulsory notification was established, the enforcement of this last named method having become more stringent with each year, with the result that between 1887 and 1902, New York has seen a reduction in the total tuberculosis death rate of 40 per cent., most of which reduction may be fairly attributed to compulsory registration and fumigation. Berlin and other continental cities, recognizing the value of the Biggs or New York method of compulsory registration and fumigation, have adopted

it with equally excellent results. A curious point in connection with its adoption in New York was that its strongest opponents at first were the physicians, but personal experience with the system has placed them among the strongest supporters.

It is a reasonable assumption that tuberculosis cannot be prevented on a large scale, unless the public health officials know where it is to be found and what persons are afflicted with it, and compulsory registration is the only method that will give the authorities this information. This premise makes necessary the conclusion that compulsory registration is then absolutely necessary, if intelligent, rational, prophylactic measures are to be carried out in a thorough and comprehensive manner.

What, now, do the terms compulsory registration and fumigation imply?

Compulsory registration means: First, that every physician is obligated to report to the health department of his city or county every case of tuberculosis which comes under his care; second, that this information shall be considered confidential and for the use of the health department only, and that no publicity shall be attached thereto; third, that if the physician states that the sanitary conditions are not bad, and that he will verbally or otherwise instruct his patient as to the dangers of infection of self and others and the means of prevention thereof, his patient will be in no manner approached by the health department; fourth, that the physician obligates himself to report to the department any change of residence or death of patient, so that fumigation of room and furnishings may be carried out by the department; fifth, that every consumptive reported by an institution or organization or by a physician who states hygienic conditions are bad, will be visited by a deputy from the health department, who will institute measures to improve the sanitation, as well as instruct the patient in means of prevention; sixth, that no placard is ever placed on the house, or that publicity of any kind is ever given to the case.

In brief, compulsory modification means that the health department is enabled to locate every person afflicted with tuberculosis, and if hygienic conditions are bad, at once to rectify the same and keep patient under surveillance; and if hygienic conditions are good, then, to fumigate and disinfect the room and furnishings when the patient moves to some other locality or dies. The system is, in fact, nothing more than effort to kindly, and without inconvenience, embarrassment, or distress to physician, patient or friends, instruct the infected person, and those who come into intimate contact with him, as to the danger of infection, and to render inoperative those dangers by care in disposal and disinfection of sputum and by fumigation of room and furnishings at proper intervals, all of this being done without a placard being placed on the house or any publicity being given to the work.

Since it is positively known that the great majority of consumptives were infected largely because of the lack of such measures, it becomes inconceivable, not only why any one should object to such measures on any ground whatsoever, but further,

how a body of medical men, such as the members of this Society, for instance, who know these truths, should hesitate to institute steps that would bring into being these beneficent and much needed measures.

To make compulsory registration and fumigation a positive preventative influence, the measures should be made State laws, and their application be made through State officials. This applies especially to California, where so many consumptives from the East are found residing not only in the large cities but in the smaller towns and country districts, the danger in those smaller places, in proportion to the number of inhabitants, being almost as great as in the larger municipalities. Public sentiment in the Golden State, if the comprehensive scope of the method were explained to the people, is fully prepared for the adoption of such measures. The attempt of some of our State legislators, a few years ago, to initiate a State quarantine against Eastern consumptives (a foolish, impracticable and inhumane measure) is an evidence of the feeling of the lay citizens of California that something should be done to protect the health of native born and of such citizens as come here free from any taint of the great white plague.

San Francisco, Los Angeles, Sacramento, and other cities and towns throughout the State, all have their slum districts or at least their crowded, filthy quarters, where a certain portion of their citizens live. There is no doubt in the writer's mind, that if a careful investigation were made of the distribution of consumptives in California's cities, it would be found that the tuberculosis morbidity and mortality was highest where the crowding and filth conditions were greatest. Some investigations made by him last year, shows that the Los Angeles wards having the highest mortality from tuberculosis were wards seven and eight, ward seven having a population per acre of 20 persons, and ward eight of 17 persons; but in ward eight (the plaza district—Chinatown—wholesale district ward) although the density per acre was less, the houses were much more crowded and the filth conditions were greater, and this was reflected in a tuberculosis mortality rate of 480 per 100,000 persons in ward eight as against a rate of 261 for ward seven. It is curious to note, also, in this connection, that the races having the highest mortality in Los Angeles are the two races living under the most unsanitary conditions, viz: the Mexicans, who had a death rate of 770, and the Russians, who had a death rate of 650 per 100,000 persons.

Let no one, therefore, delude himself with the thought that California's climate makes impossible the infection of native born and healthy citizens. It is true that we have ten or twenty fold as much tuberculosis within our State confines at the present time than would be existent under natural conditions, i. e., without the introduction of an excessive number of consumptives from the East, but that only means that the danger of infection, if hygienic laws be violated, is thereby increased ten or twenty fold.

Consumptives, as was shown in the writer's an-

alysis of Los Angeles conditions in relation to tuberculosis, live in the cheapest lodging and eating houses, and the races that have the highest mortality rates live in the most unsanitary portions of the city, precisely the conditions most favorable to the infection of a large number of other persons. We know that the climatic factors that have a germicidal action on the bacilli of tuberculosis are the oxygen of the air and sunlight, and air and sunlight, owing to the disgraceful lack of building laws in California, are as effectually kept out of the lodging and tenement houses of our state, as they are in New York, which means virtually, that an infected room in a crowded tenement or lodging house in Los Angeles or San Francisco is in every way as dangerous to the public health of Los Angeles or San Francisco as their counterparts in one of New York's slums is to the public health of that city.

The fact that the greater part of California's consumptive sick and dying are to be found in California's most unsanitary houses, is worthy of emphasis and no measures can ever reach those places so effectively and so thoroughly as can compulsory registration and fumigation. Our state, county and city health officials can initiate these measures without much extra cost or work. Compulsory registration and fumigation needs for its inauguration no machinery but what is already in existence. The largest proportion of the work would in fact be done by physicians. The only expense to the state would be the additional record books, perhaps a mild increase in clerk hire, and the cost of fumigation apparatus, disinfectants and deputies to take charge of this phase of the work. The entire annual cost could not run into very many thousands of dollars. In fact, ten thousand dollars yearly should be ample to start this work.

And for this ten thousand dollars, we know not how many human lives would be saved. But granting a human life is worth only \$2,000 to the state, if ten lives were saved yearly, the state would not have spent the money in vain. That more than ten persons are annually infected in Los Angeles, there is in the writer's mind not the least doubt. If virtually 25 per cent. of the consumptives who die in Los Angeles come from the filthy, unlicensed and non-regulated lodging houses, then 50 per cent. of the morbidity is probably to be found in such places. If, in other words, six hundred or more consumptives are constantly living in half that number of houses in Los Angeles, houses where there is a constant coming and going of transients, how can we escape the conclusion that native born and healthy citizens and visitors must be constantly in danger of infection? Is there any reason why a virulent germ placed under the same favorable environment in Los Angeles as in New York City should not be just as virulent in the one place as in the other? It may be pleasant to one's feeling of state loyalty and pride, to imagine that California's climate has this wonderful power in virulence reduction, but it certainly is neither logical nor scientific to make such a statement.

In addition to the lives saved by compulsory registration and fumigation (we cannot even approx-

imate the number scientifically, since our ignorance of the situation, through lack of proper statutes conscientiously enforced, gives us no figures on which to base conclusions), the system would be the most powerful factor that could be brought forward in the way of educating the citizens of this great commonwealth as to their proper attitude toward the disease. Compulsory registration and fumigation would at once reach all consumptives, a condition to be sought for above all others, and because we have so many consumptives in our state, the methods and meaning of preventive measures would soon be knowledge possessed by all citizens. And as a necessary corollary to this knowledge, would follow a more intelligent interest in and a demand for all hygienic and sanitary measures of whatever nature.

Have we any right to ask for greater benefits than these? Are there any other measures that could do nearly as much? There can be only one answer, and that in the negative.

Gentlemen of the Medical Society of the State of California, we are both as citizens and as medical practitioners under obligations to the people of this state to take a hand in the solution of this problem. It may be truthfully said of Los Angeles, and I believe it holds equally for San Francisco and the other cities of the state, that our large amount of tuberculosis morbidity and mortality has become a real and serious menace to the public health of our commonwealth, and it is high time to begin efforts that will get the situation well in hand.

No other prophylactic measures intended to combat tuberculosis can begin to compare in scope, practicability and efficiency to compulsory registration and fumigation. They have been tried and have more than fulfilled expectations. If New York and Berlin and other continental cities needed them, California may be said to need them almost more. The time has come when they should be brought into being in the Golden State, and it seems to me that no organization in our state can claim so good a right to go on record in their favor as this Society which is in session at the present time. The Medical Society of the State of California, in fact, should look upon such action as not only a duty, but as a privilege and an honor, a privilege and an honor which should no longer be postponed.

#### RESUME OF WORK OF SANITATION PERFORMED BY THE SAN FRANCISCO BOARD OF HEALTH, FROM APRIL 18, 1906, TO DATE.\*

By W. C. HASSLER, M. D., San Francisco.

Each one is sufficiently familiar with the memorable events of April 18th, so that it requires no review of that period for the purposes of this paper. While chaos reigned throughout the city, and it would appear that each man if he attended to his own interests would be justified, yet to the lasting credit of the inspectors of the department of public

health, as if actuated with one accord, they reported for duty within one hour of the disaster. The city was arbitrarily districted and each district placed in charge of an inspector who was directed to secure volunteers, which was done. Squads were detailed to rope off walls and buildings that were in immediate danger of collapse, and other groups were stationed along the fire line to assist in the work of rescue of injured and dead.

On April 19th temporary quarters for the department of public health were established on Laguna street, and from this point the work of sanitation began.

The squares, public parks and vacant lots were packed with the stricken multitude, and without sanitary conveniences of any kind. While they were ably protected by the military, without whom it would have been impossible to successfully cope with the situation at this period, still the gravest condition presented itself. Sick and well were confusedly packed together; water supply cut off; sewers broken and no protection from the elements, which were unusually severe for this time of the year. The medical profession of this city realizing the danger, came quickly and voluntarily to headquarters offering their services, and were immediately added to the regular staff. Details were arranged for the segregation and care of the sick and injured in the various camps, and the isolation of all those suffering with contagious disease. Provision was also made for the re-establishing of the water supply, and the construction of latrines.

Conferences were planned and meetings arranged by President Ward of the Board of Health for a special health commission, which consisted of representatives from the United States Army; the Public Health and Marine Hospital Service; the State Board of Health, and the Board of Health of this City and County. These meetings were held two and three times a day, and ways and means were devised for the proper protection of the people and the rehabilitation of sanitary conditions.

Hospitals and dispensaries were organized and established. Damaged hospitals were repaired immediately, and to this end a large force of skilled labor was summoned and materials placed at their command to complete the work. The locations of these hospitals and dispensaries were given to the public through the medium of the press and the bureaus of general information.

A call was made for plumbers for the purpose of making a house-to-house inspection; to shut off the water in houses where the pipes were found broken; to seal the toilets; to make temporary repairs in sewers and pipes, and to assist the Spring Valley Water Company in stopping the leaks, and make it possible to re-establish the water supply; 638 men were thus employed.

Then came the districting of the city into three great sanitary districts, each in charge of a physician, who appointed his corps for the control of the sub-districts, and reports of the work performed daily were forwarded to the Board of Health.

Disinfecting crews, consisting of a team, several

\* Read at the regular meeting of the San Francisco County Medical Society, August, 1906.